

Claims

WHAT IS CLAIMED IS:

1. - 30. (canceled)

31. (new) A method for determining specific conditions or changes in the endometrium or in the epithelium of other organs, the method comprising the steps of:

- a) isolating RNA from a blood sample or tissue sample; and
- b) quantitatively measuring in said blood sample or said tissue sample the expression or over expression of mRNA of at least one of β 7-hCG, β 6-hCG, and β 6e-hCG.

32. (new) The method according to claim 31, further comprising the steps of:

- c) additionally quantitatively measuring total β hCG mRNA expression or mRNA expression of at least one of β 5-hCG, β 8-hCG, β 3-hCG; and
- d) bringing into relation measured values of the step c) with measured values of the step b).

33. (new) The method according to claim 32, wherein in at least one of the steps b) and c) quantitative RT-PCR or real-time RT-PCR is used.

34. (new) The method according to claim 33, wherein, based on the cDNA obtained by reverse transcriptase (RT), total β -hCG cDNA is amplified in the first PCR step with at least one first primer pair comprised of a first primer and a second primer, wherein the first primer pair hybridizes with cDNA of β 5-hCG, β 8-hCG, β 3-hCG as well as β 7-hCG and β 6-hCG and β 6e-hCG, and in a subsequent second PCR step the cDNA of at least one of β 7-hCG, β 6-hCG, and β 6e-hCG is specifically amplified with at least one third primer, wherein the third primer specifically hybridizes with cDNA of β 7-hCG and β 6-hCG and β 6e-hCG, but not with cDNA of β 5-hCG, β 8hCG, and β 3-hCG.

35. (new) The method according to claim 34, wherein in the second PCR step additionally the cDNA of at least one of β 5-hCG, β 8-hCG, and β 3-hCG is specifically amplified with at least one fourth primer, wherein the fourth primer hybridizes specifically with the cDNA of β 5-hCG, β 8-hCG and β 3-hCG but not with the cDNA of β 7-hCG and β 6-hCG and β 6e-hCG.

36. (new) The method according to claim 34, wherein the at least one first primer pair are oligonucleotides selected from the group of sequences consisting of SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 11, and SEQ ID NO. 14, wherein the third primer is an oligonucleotide selected from the group of sequences consisting of SEQ ID NO. 3, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 13, and SEQ ID NO. 16.

37. (new) The method according to claim 35, wherein the fourth primer is an oligonucleotide selected from the group of sequences consisting of SEQ ID NO. 4, SEQ ID NO. 8, SEQ ID NO. 12, and SEQ ID NO. 15.

38. (new) The method according to claim 35, wherein at least one of the first, second, third and fourth primers is fluorescence marked.

39. (new) The method according to claim 38, wherein one of the first and second primers of the first primer pair, the third primer and optionally the fourth primer are provided with fluorescence markers that differ from one another with regard to adsorption and/or emission spectra.

40. (new) The method according to claim 31 for prospective or retrospective diagnostic of an endometrial receptivity for implantation of an embryo.

41. (new) The method according to claim 40, wherein the blood sample is taken from peripheral blood and the tissue sample is taken from tissue of endometrium or cervix of a female patient, wherein, based on the determined mRNA expression of at least one of β 7-hCG, β 6-hCG, and β 6e-hCG, conclusions in regard to receptivity of the uterus for an embryo in the actual cycle are drawn.

42. (new) The method according to claim 40, wherein the blood sample is taken from menstrual blood and, based on determined mRNA expression of at least one of β 7-hCG, β 6-hCG, and β 6e-hCG in the past cycle, prognoses of the potential receptivity of the uterus for an embryo in the subsequent cycle are made.

43. (new) The method according to 31 for tumor diagnosis.

44. (new) The method according to claim 43, wherein, for detecting uterine carcinoma, the tissue sample is removed from the endometrium or cervix of a female patient.

45. (new) The method according to claim 43, wherein values of the mRNA expression in the tissue sample are compared to values of the mRNA expression in healthy tissue.

46. (new) The method according to claim 43, wherein a value of promoter expression of at least one of β 5-hCG, β 8-hCG, and β 3-hCG is determined and is divided by the mRNA expression of total β hCG and, based on the resulting quotient, conclusions in regard to a degree of malignancy of the tumor are drawn.

47. (new) A primer sequence selected from the group consisting to SEQ ID NO. 3, SEQ ID NO. 4, SEQ ID NO. 8 to SEQ ID NO. 16.

48. (new) A diagnostic kit for determining specific conditions or changes in the uterus by quantitative RT-PCR comprising:

- a) oligo-dT,
- b) enzyme reverse transcriptase,
- c) at least two primers hybridizing with cDNA of at least one of β 7-hCG, β 6-hCG, and β 6e-hCG, wherein at least one of the two primers does not hybridize with at least one of β 5-hCG, β 8-hCG, and β 3-hCG,
- d) a DNA polymerase resistant above 80 °C, and
- e) reaction buffer.

49. (new) The diagnostic kit according to claim 48, wherein the at least two primers comprise:

a first primer pair comprised of a first primer and a second primer wherein the first primer pair hybridizes with cDNA of β 5-hCG, β 8-hCG, and β 3-hCG as well as β 7-hCG, β 6-hCG, and β 6e-hCG; and

a third primer that hybridizes specifically with cDNA of β 7-hCG and β 6-hCG and β 6e-hCG but not with cDNA of β 5-hCG, β 8-hCG, β 3-hCG.

50. (new) The diagnostic kit according to claim 49, wherein the at least two primers comprise a fourth primer that hybridizes specifically with cDNA of β 5-hCG, β 8-hCG, and β 3-hCG but not with cDNA of β 7-hCG and β 6-hCG and β 6e-hCG.

51. (new) The diagnostic kit according to claim 49, wherein the first primer pair

is selected from the group of sequences consisting of SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 11 and SEQ ID NO. 14, and wherein the third primer is selected from the group of sequences consisting of SEQ ID NO. 3, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 13, and SEQ ID NO. 16.

52. (new) The diagnostic kit according to claim 50, wherein the fourth primer is selected from the group of sequences consisting of SEQ ID NO. 4, SEQ ID NO. 8, SEQ ID NO. 12, and SEQ ID NO. 15.

53. (new) The diagnostic kit according to claim 50, wherein at least one of the first, second, third and fourth primers is fluorescence marked.

54. (new) The diagnostic kit according to claim 53 wherein one of the first and second primers of the first primer pair, the third primer and optionally the fourth primer are provided with fluorescence markers that differ from one another with regard to adsorption and/or emission spectra.

55. (new) The diagnostic kit according to claim 48, comprising a defined amount of mRNA or cDNA of at least one of $\beta 5$ -hCG and $\beta 7$ -hCG as a standard.

56. (new) The diagnostic kit according to claim 48 for prospective or retrospective diagnostic of endometrial receptivity for implantation of an embryo.

57. (new) The diagnostic kit according to claim 48 for tumor diagnosis.

58. (new) A variant $\beta 6e$ of the $\beta 6$ gene or $\beta 7$ gene having a nucleic acid sequence SEQ ID NO. 7 and/or coding for a protein with the amino acid sequence selected from the group consisting of SEQ ID NO. 17 and SEQ ID NO. 18.

59. (new) A marker for prospective or retrospective diagnostic of endometrial receptivity for implantation of an embryo, wherein the marker has a gene sequence according to claim 58 or SEQ ID NO. 5 or SEQ ID NO. 6.

60. (new) A marker for tumor diagnostic, wherein the marker has a gene sequence according to claim 58 or SEQ ID NO. 5 or SEQ ID NO. 6.

61. (new) A method for prospective or retrospective diagnostic of endometrial receptivity for implantation of an embryo and for tumor diagnostic by of real-time RT-PCR, the method comprising the step of employing gene sequences SEQ ID NO. 1 to SEQ ID

NO. 16 with or without fluorescence marker conjugation for measuring quantitatively gene expression of at least one of β 5-hCG, β 8-hCG, β 3-hCG, β 7-hCG, β 6-hCG, and β 6e-hCG.